AD-A163 385 MANNING IMPLICATIONS OF LOGISTICS SUPPORT FOR AIRLAND BATTLE(U) ARMY SCIENCE BOARD WASHINGTON DC R J BAER ET AL. OCT 85 1/1

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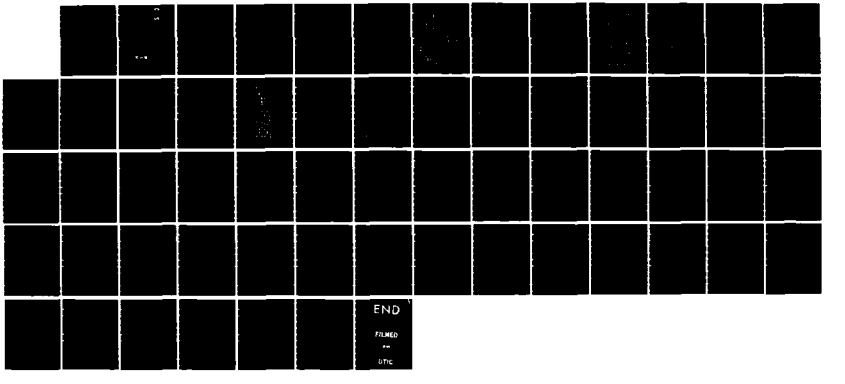

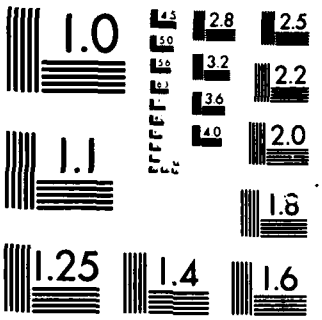

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ARMY SCIENCE BOARD

FINAL REPORT OF THE 1985 SUMMER STUDY

ON

MANNING IMPLICATIONS OF LOGISTICS SUPPORT FOR AIRLAND BATTLE

OCTOBER 1985

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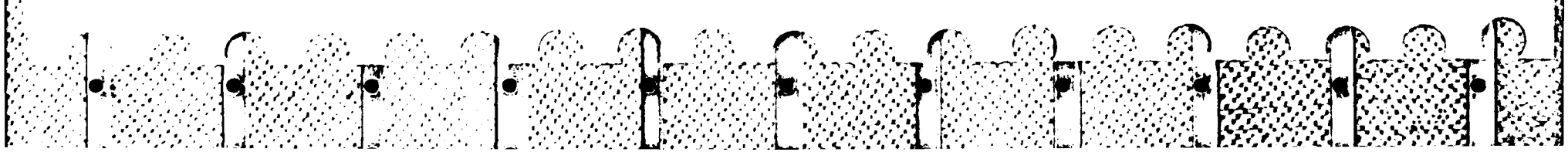

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310-0103

21 JUL 1986

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Army Science Board Final Report of the 1985 Summer Study on "Manning Implications of Logistics Support for AirLand Battle"

Attached is the Army Science Board's Final Report of the 1985 Summer Study on "Manning Implications of Logistics Support for AirLand Battle."

The study, cosponsored by the Deputy Chief of Staff for Personnel and the Deputy Chief of Staff for Logistics, focuses on the problem: How can the Army ensure the supportability/sustainability of the projected operational concepts in consideration of manpower constraints, increasing sophistication of equipment, and the balance of support forces among Army components? Recommendations concern Army systems design reflecting associated logistics functions, training the total force in logistics responsibilities, personnel management improvements, and increased effort in creating data bases/modeling.

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Assistant Secretary of the Army
(Research, Development, and Acquisition)

Attachment

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Logistics	Data Base	Reserve Component
System Design	Modeling	Supportability
Training	Airland Battle	Sustainability

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)* This report addresses the conclusions/recommendations of the Army Science Board Summer Study on Manning Implications of Logistics Support for Airland Battle. The Study focuses on the problem: How can the Army ensure the supportability/sustainability of the projected operational concepts in consideration of manpower constraints, increasing sophistication of equipment, and the balance of support forces among Army components? Recommendations concern Army systems design reflecting associated logistics functions, training the total force in logistics responsibilities, personnel management improvements, and increased effort in creating data bases/modeling.

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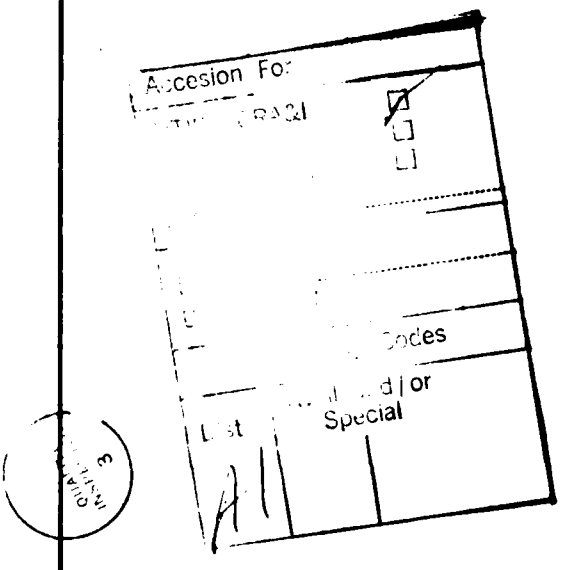

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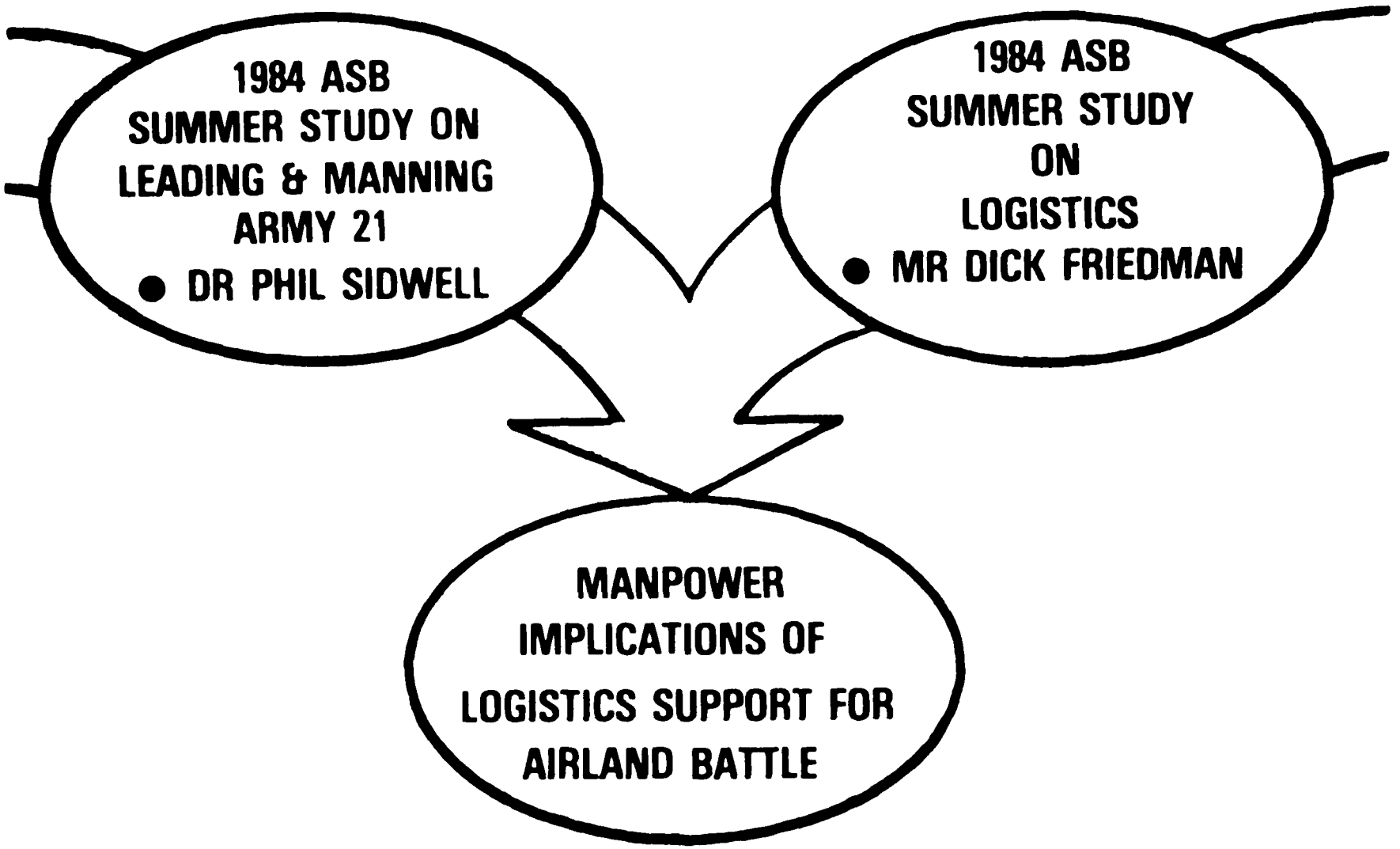


EXECUTIVE SUMMARY

The Army has properly recognized and taken action to address the requirement for increased combat power in the next two to three decades. Specifically, through the Army of Excellence (AOE) initiative, more divisions and supporting combat elements are being created in the active force structure; and combat elements of both the Active Component (AC) and Reserve Component (RC) are being restructured to provide better total Army combat capability. This action requires both more effective utilization of combat service support (CSS) assets in the AC and greater reliance under the RC for CSS functions in the total Army. In order to satisfy these requirements, the 1985 Army Science Board Summer Study (ASB SS) on the Manpower Implications of Logistics Support for the Airland Battle believes strongly that a number of actions must be taken in four areas: system design, training, personnel management, and data bases/modeling.

SYSTEM DESIGN

Army equipment is more technically sophisticated and places more demands on soldier skills than a decade ago. This trend will continue as we reach for more technology to respond to the projected threat into the next century. The projected organizational and operational (O&O) concepts, e.g., Airland Battle (ALB), are increasingly dependent upon new capabilities across the board. Heretofore, in the application of technology, the Army has emphasized combat performance at the expense of CSS. With a balanced approach to the exploitation of technology in system design, both improved combat performance and reduced CSS burden can be achieved. And, as new technology is applied, Army systems designs must reflect the total Army skill base and training constraints associated with logistics functions.

TRAINING

In future conflicts, the Army must be prepared to have little or no advance notice prior to deployment of forces. Tables of Organization and Equipment (TOE) units in both the AC and RC cannot plan on having weeks or months to reach full strength and to train. About 32,000 active Army spaces authorized for 12 logistics Career Management Fields (CMF) in FY 85 are for Tables of Distribution and Allowance (TDA) spaces rather than TOE spaces. Trained individuals in such TDA spaces can and should be better programmed in peacetime for their best utilization in conflict. Trained individuals also exist in the Individual Ready Reserve (IRR) and as recent retirees. Very little benefit is achieved or currently anticipated from these people against the growing CSS requirement.

PERSONNEL MANAGEMENT

The Army's modern systems require personnel with more training/higher skill levels. The Army has responded by increasing specialization and creating more Military Occupational Specialities (MOS). The challenge to access, train, and retain logistics personnel in the total force will be increased accordingly and at a time of increasing manpower constraints and changing demographics. Consequently, the Army must adopt a far-sighted, long-term policy which recognizes the realities of the supply of prior and non-prior service recruits, the personnel demands imposed by technology growth, and all the economic trade-offs involved in career versus

non-career soldiers. By better managing its people resources, the Army can obtain significant benefits in reduced training investment, improved operating strength and readiness, and a higher degree of experience in critical, high-skilled logistics MOS.

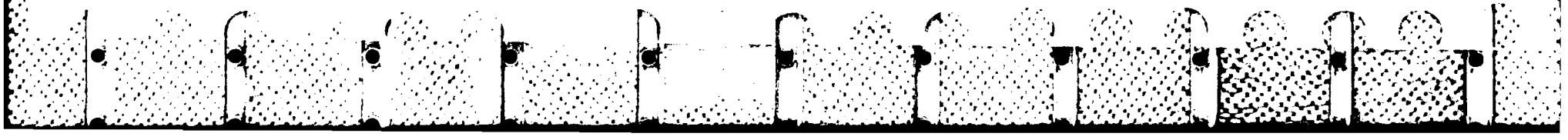
DATA BASE/MODELING

In order to: (1) provide adequate CSS support to the future Army force operating under the more logistically taxing ALB concept; and (2) live within manpower constraints (which means using the minimum numbers of active Army personnel for logistics), it is essential that quantity and quality requirements for logistics functions be accurately stated. However, force structure planning for CSS relies heavily on systems documentation and the sample data collection (SDC) program, both of which provide logistics data of questionable validity. Significant errors in personnel skill assessment and workload factors contained in logistics support analysis (LSA) data bases will propagate through subsequent manpower and MOS planning activities. Additionally, LSA models are based on linear assumptions and do not appear to include gains in efficiency that are available through aggregation and economy of scale. Hence, the Army needs to develop improved logistics data and information systems if it is to define and meet ALB CSS requirements.

As the Army addresses the logistics issues related to supporting the future force, we believe that our recommendations to improve the Army's CSS capability should be viewed as an integrated system and not as a collection of independent actions. For any logistics problem there may be one or more combinations of hardware, training, personnel management, and information management actions to achieve a solution. Combined actions in more than one area will result in a more effective and less expensive solution than a brute force approach in only one area. Consequently, the Army must craft a strategy which maximizes its return in CSS capability from its investment in the recommended actions detailed below.

TERMS OF REFERENCE

- EVALUATE THE LOGISTICS MANPOWER IN EACH ARMY COMPONENT, IN LIGHT OF ITS ASSIGNED MISSION
- IDENTIFY ACTIONS AND RESOURCES REQUIRED TO CORRECT MANPOWER DEFICIENCIES
- IDENTIFY TECHNOLOGICAL ADVANCES, POLICIES, AND PROCEDURES TO IMPROVE BATTLEFIELD SUSTAINMENT AND ENHANCE SOLDIER PERFORMANCE



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The Army has properly recognized and taken action to address the requirement for increased combat power in the next two to three decades. Specifically, through the AOE initiative, more divisions and supporting combat elements are being created in the active force structure; and combat elements of both the AC and RC are being restructured to provide for better total Army combat capability. This action results in a significant number of the CSS functions for the ready/active force becoming the responsibility of the RC. Some of the relevant factors are:

From FY 82 to FY 86, total Army authorized manpower end strength increased by about 87,000 (from 1,445,000 to 1,532,000). All but 400 of that approximate 87,000 increase was in the RC.

From FY 82 to FY 85, active Army logistics force structure spaces decreased by about 17,000 (from 214,000 to 197,000).

From FY 85 through FY 91 an increase of about 18,200 spaces is projected in the total Army logistics force structure and about 13,400 of these spaces are in the RC. Approximately 7,200 of these RC space increases are in four logistics CMF (See Table I).

TABLE I

CMF	Projected Increase in RC Authorization (FY 85 - FY 91)
CMF 23 - Air defense system maintenance	550
CMF 27 - Land combat/air defense systems intermediate maintenance	600
CMF 63 - Mechanical maintenance	5,700
CMF 67 - Aircraft maintenance	350
Total	7,200

In the Army National Guard (ARNG), these four CMF are only 48% to 76% filled; in the United States Army Reserve (USAR), they are 80% to 100% filled. In both the USAR and the ARNG, less than 75% of these filled spaces are occupied by qualified (fully trained) individuals during FY 85. Significant RC space increases are being projected for logistics CMF that the Army has not filled to date.

Both the current deficiencies in the RC and the significantly more demanding CSS requirement to be placed upon the RC around the Year 2000 should become paramount considerations for Army management. Much of the RC has a severe shortage of up-to-date, compatible equipment to prepare for even today's mission. The gap

between requirement and capability in the RC seems certain to widen, at least in the short term, as the increase in combat capability in the AC is achieved before the corresponding CSS capability is achieved in the RC.

We recognize that actions such as establishment of regional maintenance training sites (RMTS) and issuance of first-line hardware are in process to meet some of the needs of the RC. These actions and other CSS readiness actions must receive equal or greater priority than supported combat elements receive if the balance in the force required to meet the future over-arching Army O&O concept is to be achieved.

In summary, there exists a serious logistics support shortfall accompanied by a severe manpower problem, both of which will grow in the future. The Army has begun to address some of these issues in a number of studies and programs which include:

- o The United States Army Europe (USAREUR) Support Structure;
- o Battlefield Sustainment/Logistics Research and Development (Key Operational Capabilities); and
- o Soldier Performance Enhancement (Key Operational Capabilities).

Previous ASB SS have provided recommendations to improve aspects of logistics support. There remain significant problems to be solved.

Army equipment is more technically sophisticated and places more demands on soldier skills than a decade ago. This trend will continue as we reach for more technology to respond to the projected threat into the next century. The projected O&O concepts, e.g., ALB, are increasingly dependent upon new capabilities across the board. In the application of technology, the Army has emphasized combat performance at the expense of CSS. With a balanced approach to the exploitation of technology in system design, both improved combat performance and reduced CSS burden can be achieved. And, as new technology is applied, Army systems design must reflect the total Army skill base and training constraints associated with logistics functions.

The dynamics of demographic and economic development in the United States will produce, by the Year 2000, a manpower base very different from today's, not only in numbers, but in other characteristics important to the Army's manpower needs. The population of males in the age group 17-23 is projected to decline as the nation's population is increasing. At the same time, if current trends continue, the products of the American educational system will be less competent in technical and scientific skills. The Army will be facing stiffer competition to obtain and retain appropriately qualified personnel. The active Army authorized end strength has remained almost constant, between 780,000 and 785,000 for over a decade; and political constraints on Army size are likely to continue unless there is a significant change in international tensions. Consequently, the Army cannot prudently plan on increasing manpower authorizations to solve logistics or other problems.

In future conflicts, the Army must be prepared to have little or no advance notice prior to deployment of forces. TOE units in both the AC and RC cannot plan on having weeks or months to reach full strength and to train. About 32,000 active Army spaces authorized for 12 logistics CMF in FY 85 are for TDA spaces rather than TOE spaces. Trained individuals in such TDA spaces can and should be better programmed in peacetime for their best utilization in conflict. Trained individuals also exist in the IRR and as recent retirees. Very little benefit is achieved or currently anticipated from these people against the growing CSS requirement.

The Army's modern systems require personnel with more training/higher skill levels. The Army has responded by increasing specialization and creating more MOS. The challenge to access, train, and retain logistics personnel in the total force will be increased accordingly and at a time of increasing manpower constraints and changing demographics.

In order to: (1) provide adequate CSS support to the future Army force operating under the more logistically taxing ALB concept; and (2) live within manpower constraints (which means using the minimum numbers of active Army personnel for logistics), it is essential that quantity and quality requirements for logistics functions be accurately stated. To achieve these objectives, appropriate logistics data and information systems are essential.

The transfer of logistics support responsibilities to the RC is a logical step toward reestablishing the priority need for combat power to meet the threat in the 2000's. Ensuring that the RC can perform its missions is a challenge to Army management/leadership and will not be met without special attention and effort at least comparable to that given the AOE combat force decisions. Some of these changes have been described in the preceding paragraphs. However, in order to formulate appropriate responses to these changes, their impact must be recognized, quantified, and analyzed, giving realistic attention to the unique RC environment, i.e., training time constraints and equipment availability. The Year 2000 supportability requirement probably can be met, with the RC in a major role, if the Army:

- o does the necessary analytic work to:
  - establish the true magnitude of the ALB requirement;
  - define the readiness requirement of each support element;
  - assess the projected RC capability to meet each requirement;

- o takes action to:
  - address the RC's long-standing shortfalls;
  - use all of the available Army manpower and training resources; and

- o adjusts the projected AC/RC support force to eliminate any remaining unrealistic assignments/missions, if RC shortfalls remain.

As the Army addresses the logistics issues related to supporting the future force, we believe that our recommendations to improve the Army's CSS capability should be viewed as an integrated system and not as a collection of independent actions. For any logistics problem there may be one or more combinations of hardware, training, personnel management, and information management actions to achieve a solution. Combined actions in more than one area will result in a more effective and less expensive solution than a brute force approach in only one area. Consequently, the Army must craft a strategy which maximizes its return in CSS capability from its investment in the actions described below.

See Appendices A and B for further background and data.

THE PROBLEM

HOW CAN THE ARMY ENSURE THE SUPPORTABILITY AND SUSTAINABILITY OF THE PROJECTED OPERATIONAL CONCEPTS IN CONSIDERATION OF MANPOWER CONSTRAINTS, INCREASING SOPHISTICATION OF EQUIPMENT, AND THE BALANCE OF SUPPORT FORCES AMONG ARMY COMPONENTS ?

SYSTEMS DESIGN

ARMY SYSTEMS DESIGN SHOULD REFLECT THE ACTIVE AND RESERVE COMPONENT SKILL BASE AND TRAINING CONSTRAINTS ASSOCIATED WITH LOGISTICS FUNCTIONS.

TRAINING

WITH THE ADVENT OF NEW AND/OR MORE COMPLEX MATERIEL IN THE ARMY INVENTORY, THE CHALLENGE TO TRAIN THE TOTAL FORCE IN LOGISTICS RESPONSIBILITIES IS INCREASED ACCORDINGLY.

PERSONNEL MANAGEMENT

A CONTINUING INCREASE IN HIGH-TECHNOLOGY MANDATES A SIGNIFICANT IMPROVEMENT IN ACCESSION, RETENTION, AND EFFECTIVE UTILIZATION OF APPROPRIATE LOGISTICS PERSONNEL.

DATA BASES/MODELING

ADEQUATE AND ACCURATE TECHNICAL DOCUMENTATION, DATA BASES, AND LOGISTICS MODELS ARE REQUIRED TO DEFINE AND SUBSEQUENTLY MEET AIRLAND BATTLE COMBAT SERVICE SUPPORT LOGISTICS REQUIREMENTS.

SYSTEMS DESIGN

ISSUE I: ARMY SYSTEMS DESIGN SHOULD REFLECT THE ACTIVE AND RESERVE COMPONENT SKILL BASE AND TRAINING CONSTRAINTS ASSOCIATED WITH LOGISTICS FUNCTIONS.

RECOMMENDATIONS:

- TRADOC CAUSE THE CONCEPT BASED REQUIREMENTS SYSTEM TO INCLUDE SOLDIER PERFORMANCE ENHANCEMENT IN SYSTEM SUPPORTABILITY AND SUSTAINABILITY FUNCTIONS IN THE DEVELOPMENT OF OPERATIONAL AND ORGANIZATIONAL CONCEPTS
- TRADOC ESTABLISH GOAL(S) WHICH REDUCE SIGNIFICANTLY THE MAXIMUM TIME TO TRAIN (MTTT) FOR OPERATIONAL/MAINTENANCE SKILLS IN NEW SYSTEM DESIGNS
- AMC (1) SPECIFY MTTT IN ALL NEW SYSTEMS, PRODUCT IMPROVEMENTS, AND NON-DEVELOPMENTAL ITEMS, (2) ASSIGN SIGNIFICANT WEIGHT TO THE MTTT IN SOURCE SELECTION AND EVALUATION, AND (3) FUND ITS ACCOMPLISHMENT IN SYSTEM DEVELOPMENT
- TRADOC/AMC UNDERTAKE DEMONSTRATION PROJECT(S) IN FY86 TO ESTABLISH THE GOALS AND SPECIFY THE REQUIREMENTS FOR MTTT
- DCSPER/DCSLOG PURSUE R&D INITIATIVES WHICH ENHANCE BATTLEFIELD SUSTAINMENT AND SOLDIER PERFORMANCE, INCLUDING DIAGNOSTICS, PROGNOSTICS, JOB PERFORMANCE AIDS, AND EMBEDDED TRAINING
- HQDA REEXAMINE THE PRIORITIES GIVEN TO THE ACQUISITION AND ISSUANCE OF ALL FIRST-LINE EQUIPMENT INCLUDING MAINTENANCE EQUIPMENT FOR THE RC

BACKGROUND

The design of new weapon systems has a major impact on logistics manpower requirements. The weapon system acquisition process is initiated in the Army with the Concept Based Requirements System. Effective system design requires that issues of soldier performance and battlefield sustainment be included in the development of the O&O concept, which documents materiel solutions required to address mission needs. As noted in the 1984 ASB SS, "Leading and Manning Army 21," early and explicit specifications of human resource constraints can guide industry toward the development of more supportable weapon systems. To the extent that soldier performance is also improved, so too will be the performance of the total system (soldier and machine). The 1984 ASB SS, "Technology to Improve Logistics and Weapons Support for Army 21," addressed the questions of and made recommendations related to battlefield sustainment.

The Army's Manpower and Personnel Integration (MANPRINT) initiative is intended to impose manpower, personnel, and training considerations across the entire materiel acquisition process. It requires that emerging systems be designed to embody operational and maintenance jobs which the Army's soldiers can reasonably be expected to perform. This means that jobs must not exceed the cognitive capabilities of operators/maintainers and that skill training must be satisfactorily accomplished with minimum time and resources.

The allocation of tasks among hardware, software, and soldiers has often assigned difficult skills with significant training demands to maintenance personnel. For example, the current training courses for communications and electronics systems maintainers (CMF 29) average 26 weeks in length, with the longest course running 39 weeks. On the average, one of every three soldiers does not complete the assigned course. Despite this significant attrition rate, the AC currently enjoys 114% of its FY 85 authorization; however, the status of the CMF across the total Army is not as favorable. The USAR is 6% short of its FY 85 authorizations with 40% of those filling CMF 29 positions listed as not qualified. The ARNG is 41% short of its FY 85 authorizations with 44% of those assigned listed as not qualified. Yet these components provide approximately one-third of the total force authorizations in communications and electronic maintenance.

While the mission of the Army in peacetime is to train and much of each work week in the AC is devoted to training, the USAR and the ARNG face severe limitations on their available training time and resources. For example, much of the RC today has a severe shortage of up-to-date, compatible Test Measurement Diagnostic Equipment (TMDE). Inadequate TMDE and lack of experience on first-line equipment and systems are negative factors in the preparation of the RC. Yet, approximately two-thirds of the logistics support for the total Army will be provided by the USAR and ARNG. Hence, it should be recognized, during system design, that many maintenance and other logistics functions affecting total system performance will be accomplished by USAR and ARNG units. Tasks should be allocated which require no more than a specified acceptable maximum time to train (MTTT). As with other aspects of MANPRINT, this factor should be significantly weighted during source selection and evaluation and its achievement appropriately resourced during system development.

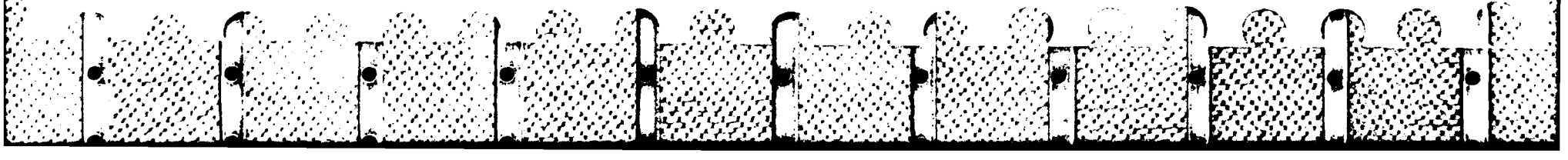
A range of new technologies is now available to assist design engineers in this effort. The Army is already moving to capture the advantages of two -- expert job aids and embedded training -- in the Soldier Performance Enhancement thrust of the Key Operational Capabilities program. More needs to be done with regard to technologies for maintenance diagnosis, prognosis, and triage. Electronic and other functional and decision support aids (1) to determine what the system failure is; (2) to predict its occurrence given a projected mission profile; and (3) to evaluate the probability of effective system recovery in light of the tactical situation and resources available will probably evolve from these technologies.

TRAINING

ISSUE II: WITH THE ADVENT OF NEW AND/OR MORE COMPLEX MATERIEL IN THE ARMY INVENTORY, THE CHALLENGE TO TRAIN THE TOTAL FORCE IN LOGISTICS RESPONSIBILITIES IS INCREASED ACCORDINGLY.

RECOMMENDATIONS:

- TRADOC TEST PRE-INDUCTION SCHOOLING IN TECHNICIAL SKILLS AT CIVILIAN INSTITUTIONS TO QUALIFY THE INDUCTEE FOR TECHNICAL LOGISTICS POSITIONS THUS PROVIDING LONGER UTILIZATION OF PERSONNEL AFTER INDUCTION AND REDUCING SERVICE SCHOOL TRAINING LOAD
- DCSPER EXPAND AND INSTITUTIONALIZE RETIREE RECALL EFFORTS AND IRR PREASSIGNMENTS FOR POST, CAMP, AND STATION TDA UNITS AND APPROPRIATE OVERSEAS THEATER REQUIREMENTS DURING MOBILIZATION
- DCSOPS DESIGNATE AT LEAST ONE OF THE PROPOSED REGIONAL MAINTENANCE TRAINING SITES AS A TESTBED FOR SKILL-BASED TRAINING TECHNOLOGY AND PROGRAM DEVELOPMENT FOR RC LOGISTICS SUPPORT PERSONNEL
- TRADOC/AMC COMBINE SIMILAR MOS SKILLS WITHIN CMF, THEREBY CONSOLIDATING COURSE REQUIREMENTS AND GENERALIZING HIGH-TECHNICAL SKILLS



BACKGROUND:
In the years to come, the Army will be faced with an increasing requirement for trained, high quality technical personnel. New military systems being assimilated into the combat arms, while designed to enhance combat capabilities, may well increase logistics complexity. Since total equipping of the force is still a few years in the future, there is time to evaluate logistics systems required to support the combat arms with emphasis on technician effectiveness, cost savings, and logistical support performance. Certainly an important part of this performance is the immediate promulgation of draft Army Regulation (AR) 602-XX, Manpower and Personnel Integration (MANPRINT).

A program of preinduction schooling would prepare individuals for various levels of logistics skills, while concurrently reducing the TRADOC training load. Established technical schools and junior colleges are available for such technical training. This program would increase the soldier's availability to meet unit logistics functions. Industry has accepted theory-based instruction for new employees, e.g., General Motors' Automotive Skill Engineering Program, and the philosophy of broad skill training for employees. The Army should consider similar programs.

The Army has examined trial programs using the talents of retirees (Grey Thunder and Certain Sage) in the event of mobilization. These retirees, approximately one-quarter million available for mobilization, constitute an extremely valuable pool of trained personnel, approximately 63,000 of whom have years of logistical experience. At a minimum, retiree recall personnel should be programmed to replace, upon mobilization, the 16% of the approximately 196,000 active Army logistics peace-time spaces which are found in TDA units. Some recalled retirees and members of the IRR could qualify for duty overseas and be pre-assigned to fill existing vacancies in deployed forces as well as against Continental United States (CONUS) TDA requirements. Skill degradation after separation must be considered in this call-up program. The Army Training Board Study proposed to investigate skill degradation should include not only the IRR but also recent retirees.

Some two-thirds of the Army's logistics responsibilities are assigned to the RC. To accomplish assigned tasks involves skills which demand significant commitment of training time and resources. Hence, it is critical that the Army capture the advantages of advanced training technologies which include:

- o enhancement of transfer of training;
- o high retention of technical skills;
- o ready application of technology in fielded units; and
- o easy exportability to the RC training environment.

These advanced technologies include computer-based instruction, teleconferencing, and artificial intelligence.

Non-commissioned officers (NCO) from the RC will be trained at regional maintenance training sites, which are high technology, logistics training institutions utilizing both civilian and military instructors. These MOS-qualified NCOs will serve in turn as unit instructors when they return to their home station logistics organizations. One or more of these sites should be designated as a test bed for utilization of off-the-shelf training technology. The designation of these sites would provide for an efficient method to institutionalize the use of technology in a rapid manner similar to the materiel non-developmental item (NDI) process. With the acceptance of pre-induction, theory-based schooling and broad skill training described above, the Army should achieve greater logistics effectiveness.

As new combat systems and differing technologies are introduced into the force structure, logistics MOSs will increase. As the Army acquires new weapon systems, the older systems of the same type, e.g., M1, M60, and M48 tanks, are not removed from the field. This requires that the personnel management system not only create new operator and support MOSs but also maintain older MOSs thus resulting in greater numbers of MOSs with less density of personnel in each.

The requirement for broad technical training coupled with the ability to provide such training must accompany the Army's adoption of high tech systems. Technologies obviously differ, but personnel of various backgrounds can be trained to operate effectively within a broad technology. An effort should be made to broaden the expertise of logistics support personnel on a continuing basis.

See Appendix C for further background and data.

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PERSONNEL MANAGEMENT

ISSUE III: A CONTINUING INCREASE IN HIGH TECHNOLOGY MANDATES A SIGNIFICANT IMPROVEMENT IN ACCESSION, RETENTION, AND EFFECTIVE UTILIZATION OF APPROPRIATE LOGISTICS PERSONNEL.

RECOMMENDATIONS:

- TRADOC PROPONENTS JUSTIFY QUANTITY AND QUALITY REQUIREMENTS WITHIN EACH MOS, AND DCSPER ALIGN RECRUITING TARGETS TO BE CONSISTENT WITH THE ESTABLISHED REQUIREMENTS AND THE PROJECTED RECRUITMENT POOL
- DCSPER CONDUCT A STUDY TO ESTABLISH TOTAL AC/RC RETENTION RATE TARGETS FOR CRITICAL HIGH-SKILL MOS BASED ON:
  - THE PROJECTED SUPPLY AND DEMAND
  - HISTORICAL RECRUITMENT AND ATTRITION TRENDS
  - LIFE-CYCLE COSTS INCLUDING TRAINING INVESTMENT AND RETIREMENT BENEFITS
- DCSPER REVISE THE ENLISTED PERSONNEL MANAGEMENT SYSTEM FOR DOCUMENTED HIGH-SKILL, HIGH-PRIORITY MOS, TO ENABLE CAREER PROGRESSION WITHOUT A MANDATORY REQUIREMENT FOR PARALLEL LEADERSHIP PROGRESSION
- DCSOPS/DCSLOG RESOLVE WARTIME OBLIGATIONS AND STATUS OF PRIVATE CONTRACTORS WHO PROVIDE LOGISTICS FUNCTIONS

To solve the operational and logistics problems of the ALB, the Army must accomplish a significant improvement in accession, retention, and effective utilization of its logistics personnel. Without such improvements, the steady increases in high technology applications to Army weapons systems, coupled with changing United States demographics, will make the Army's logistics mission increasingly difficult to accomplish.

An examination of the single weapon system, the Main Battle Tank, illustrates the fact that more technical MOSs are required for the support of the M-1 than for any of its predecessors. It has also been shown that higher mental category personnel and a more substantial training investment to achieve MOS-qualification are required to support the M-1. This example holds for the planned and product-improved weapons systems which will constitute the fighting force of the early 21st century.

As the complexity of the support functions increases, the Army will experience a recruitment pool of available, qualified 17-23 year-old males (the primary personnel source) which is declining from 5.8 million in 1984 to 4.7 million in 1994. The total Army will face increased competition from other military services and civilian employers, especially for the brighter, more talented individuals in this smaller pool. The Army historically has achieved an overall retention rate of approximately 45% of those eligible first-term enlistees; this rate is similar for most CMF. Although first-term recruitment goals for quality (i.e., mental category distribution) largely have been met, the quality distribution within the retained, second-term personnel appears to be substantially lower. Considering the increasing needs for high-quality trained personnel within the technical MOS, it appears that these historical retention rates and quality distributions are neither cost-effective nor sufficient.

Nearly 10% of the total Army budget is invested in personnel training. For the high skill, technical MOS, formal schooling may exceed 50 weeks in duration, with 10 to 30 week courses common in many of the logistics CMF. This substantial investment of time and budget, when viewed in light of the Army's needs of the future, will require a reexamination of past and current policies toward accession and retention of personnel, as well as the alternatives previously discussed under Issues I and II.

A far-sighted, long-term policy must be developed which recognizes the realities of the supply of prior and non-prior service recruits, the personnel demands imposed by technology growth, and all the economic trade-offs involved in career versus non-career soldiers. By better managing its people resources, the Army can obtain significant benefits in reduced training investment, improved operating strength and readiness, and a higher degree of experience in critical, high-skill logistics MOS.

While this may be partially achieved by improvements in retention rates, once the problems of supply, demand, and economic trade-offs are fully known, other options also should be explored. These options include changes in the Enlisted Personnel Management System (EPMS), as previously recommended in 1982 and 1983 ASB SS, to enable career progression in a technical field without a mandatory requirement for parallel leadership progression. In addition, since the Army is continuing to expand the role of private contractors, their obligations must be resolved to ensure the availability of these services during wartime.

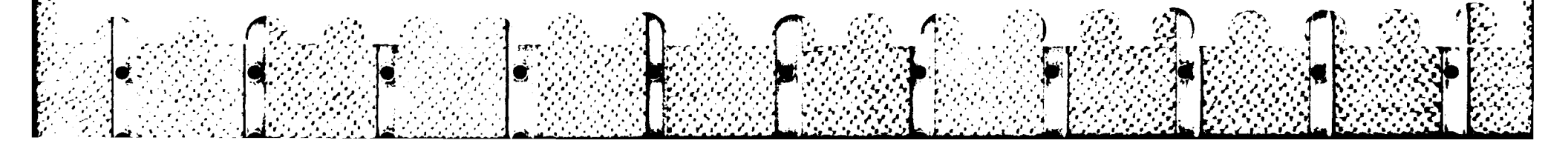
See Appendix D for further background and data.

DATA BASES/MODELING

ISSUE IV: ADEQUATE AND ACCURATE TECHNICAL DOCUMENTATION, DATA BASES, AND LOGISTICS MODELS ARE REQUIRED TO DEFINE AND SUBSEQUENTLY MEET AIRLAND BATTLE COMBAT SERVICE SUPPORT LOGISTICS REQUIREMENTS

RECOMMENDATIONS:

- TRADOC/AMC INSTITUTE PROCEDURES TO ENSURE ADEQUATE FUNDING AND TO DISCIPLINE THE REQUIREMENT FOR RAM/ILS PROGRAMS DURING DEVELOPMENT OF NEW SYSTEMS, PRODUCT IMPROVEMENT PROGRAMS, AND ACQUISITION OF NDI
- TRADOC/AMC DEVELOP AND INSTITUTE A STREAMLINED LOGISTICS DATA BASE PROGRAM, ORIENTED TOWARD THE NEEDS OF CSS FORCE STRUCTURE PLANNERS WITH A PAYOFF FOR THE USER
- AMC, EMPHASIZING SIMPLICITY, STANDARDIZE AND RIGOROUSLY DISCIPLINE FIELD LOGISTICS DATA COLLECTION EFFORTS, E.G., REDEFINE THE DATA FORMATS FOR LSA AND SDC AS STANDARDS
- DCSOPS DEVELOP CSS FORCE STRUCTURE PLANNING MODELS WHICH ARE STRUCTURED TO REFLECT SPECIFIC, DYNAMIC, OPERATIONAL SCENARIOS, AND DCSLOG ACCOUNT FOR THE PRODUCTIVITY GAINS AVAILABLE THROUGH WORKLOAD AGGREGATION



BACKGROUND:

The Army uses available logistics data bases and models as tools in CSS force structure planning. The models are based on linear assumptions and do not appear to include the gains in efficiency that are available through aggregation and economy of scale. The models, as currently formulated, seldom use real life constraints. They are open-ended and use the inputs supplied by field commanders as requirements, rather than those based on realistic evaluation of limited supplies, time, transport, etc. Simulations should be conducted for the CSS based on these constraints. Modeling results usually are adjusted by analysts' judgments which are not based on quantitative factors.

The present process which generates the required input data for the models begins during full scale development of an Army system or during acquisition planning of Non-Developmental Items. An Integrated Logistics Support (ILS) program is performed during this development phase. A key element of the ILS program is the LSA which is the process by which the initial logistics source data base is produced. If the data are substantially in error or become outdated, the CSS force structure may be designed incorrectly and could impair the logistics mission.

Force structure planning for the CSS relies heavily on systems documentation, the reliability, availability, and maintainability (RAM) information in the LSA data base, and the SDC program. Significant errors in the personnel skill assessments and workload factors contained in the LSA data base will propagate through subsequent manpower and MOS planning activities.

Programs to collect actual logistics workload data on systems after they are fielded and through their life cycle are accomplished only on a sample basis, i.e., only a limited number of "high visibility" systems are subjected to SDC. Thus, only those systems in the SDC program can have errors in their initial workload estimates corrected later in their life cycle.

The LSA data format that is used during systems development to create the initial data base is reasonably well prescribed. However, the formats used to collect data for the SDC program after fielding are not standard. For example, the following variations exist: (1) the specific data points collected vary across commodity commands and from one subordinate command to another; (2) for the most part, SDC is conducted at organizational maintenance levels.

Significant enhancements are needed in the logistics data bases. Substantial increases in the quality and quantity of skilled personnel assigned to these programs and substantial investment in new data processing technologies and systems are required. Because it may be difficult to acquire sufficient numbers of skilled personnel to interpret the data and conduct the analyses, artificial intelligence (specifically expert systems technology) will be required. Logistics modeling, support analyses, and data collection and interpretation are areas where expert systems technology can yield significant payoff.

See Appendix E for further background and data.

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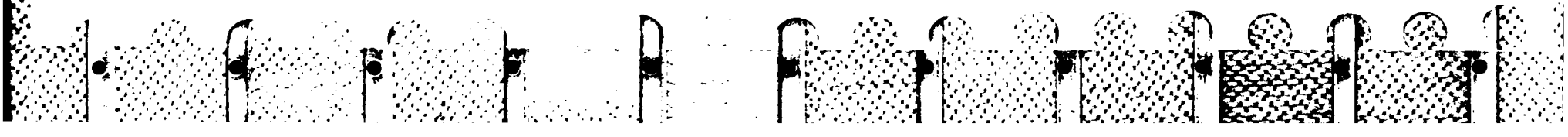


APPENDICES INDEX

APPENDIX A

Overview: The Army's Changing Operational and Support Requirement

The study group was initially tasked to examine the manpower implications of logistic support of Army 21. This group, as did the 1984 Logistics SS, found that the Army 21 doctrine is still in a formative stage. However, ALB doctrine is becoming well defined and it can be reasonably assumed that there will be an evolutionary development of the ALB doctrinal thrusts into what will be the Army doctrine of the 2000-2010 period. What is important to the study objective is that there be adequate attention given to CSS as the (O&O) concepts for the period Year 2000 and beyond are developed and implemented. As this is to be an evolutionary process, the impact of ongoing Army actions and plans for ALB and the discernible trends are of significance, as well as the expectations and/or assumptions with respect to the elements of the environment of the target time frame (2005) that have Army implications.

Interrelated with ALB and this evolution to Army 21 is the AOE now being implemented. The Combined Arms Center Development Activity (CACDA) has stated AOE to be a program to:

- o match force development to doctrine;
- o obtain a better balance between "tooth and tail" in the AC within a fixed end strength; and
- o obtain an overall better balanced total Army force.

These objectives and the associated implementing actions will have a direct interaction with the ALB doctrine and emerging Army 21 O&O requirements. They are essential objectives in both a short and long-term perspective and must be fully attained or the operational needs of the objective period will not be achievable in our judgement.

The Army's initial AOE actions have logically and correctly addressed combat power as the priority issue. However, this has resulted in an increasing dependence on the RC to provide the required logistics support. As we increase combat power, we are also increasing both the quantity and quality of the logistics support required to obtain and sustain that acquired level of force. The point is, we are not just shifting responsibilities or missions but are at the same time increasing the number and variety of the support missions. We are getting more "tooth," but we are creating an increasingly larger and more complex requirement for "tail." How to adequately accomplish the required logistics support mission with available resources becomes the umbrella issue of this ASB SS. The fundamental objective being to enhance the AOE as it evolves from ALB into Army 21 by ensuring its viability and supportability through the full spectrum of operational requirements.

An Army perspective of the target time frame based on history, current trends, and projections describes some of the consequences for the US forces of a changing world as:

- a technological advancement in weapons;
- a growing probability of low intensity conflict;
- a gain in importance of space systems;
- a continuing requirement for mix of forces;
- an increased probability of conflict over resources; and
- a continued growth of regional powers.

It follows from this that we must be prepared for any and all levels of the spectrum of war and have the capability of projecting power through forward deployments and more rapid, strategically deployable forces. It states ALB to be the foundation for the evolution to that capability in both an operational and support sense.

Most commentary on the nature of warfare in that period talks of little warning and preparatory time; greater need for and reliance on electronics; shorter but more violent encounters between opposing forces; and a considerably increased burden on CSS. Our forces will rely much more on firepower and mobility to strike deep to gain an advantage while incurring fewer friendly casualties on a highly fluid battlefield.

The ALB fighting philosophy seeks to throw the enemy off balance, stresses seizing the initiative, and emphasizes maneuver warfare. The imperatives from an operational level perspective are:

- o Depth - Rear and deep battles;
- o Initiative - Deep maneuver with operational reserves to seize, sustain initiative;
- o Agility - Faster decision cycles; and
- o Synchronization - Concentrate combat power in time and space.

The operational forces thus will operate in autonomous roles with forces including support elements tailored to the mission. The battlefield will have less structure, be more fluid, and will place greater dependence upon firepower, all aspects of mobility, and force sustainment. The importance of the soldier will be no less than today, perhaps more so, but his/her role will be more materiel enhancing than the vice versa of today.

The target period logistics imperatives as defined by TRADOC are twofold:

o Sustain the force; and

o Preserve the force by enabling the deployability and maneuver and maximizing the availability of firepower.

These are simple, straightforward and somewhat obvious priority missions, but they present tremendous new challenges for the support structure and its commanders when analyzed against the extremely demanding operational concepts previously described.

Translated into specific requirements it literally means the movement of and handling of most of the required expendable resources of war, e.g., ammunition, Petroleum Oils and Lubricants (POL), spare parts, barrier materials in a third world country will be least planned for and most difficult to accomplish. The support forces will be more materiel dependent, the equipment more sophisticated and, though simpler to operate and maintain at the user/operator level, more maintenance complex at least at the Direct Support (DS) and General Support (GS) level. As we seek to reach out farther with target acquisition and attack means, we drastically increase the importance of autonomous task forces, e.g., more battalion- and brigade-size, self-sufficient groups. We will require not only more support capability overall from the first day of battle, but a broader base of skills in the critical high tech areas as we deal with more independent pieces of the force over greater distances. Finally, the most probable type of conflict, low intensity, will require an even greater attention in our planning and the sensitivity of time in the broadest sense.

It is our conclusion that the changing operational demands of the early years of the next century will significantly impact the CSS role and requirements of the Army of that period. The AOE initiatives are essential steps if we are to meet the operational requirements. But, as they are implemented, there must be an equally realistic and candid assessment of the CSS required to make ALB and Army 21 concepts and objectives achievable, with the total Army manpower resources available.

APPENDIX B

Overview: Some Demographic Considerations

The established demographic data bases and methods of analysis principally provide data on the distribution of age, sex, race, education, and some measurements of intellectual and skill development. These have been developed in response to the social and economic needs of the nation over the past four years. They are now used to develop short range Army recruiting tactics.

The demographic and economic situation in the US is changing rapidly. Modern technology is transforming the economy of the nation from one based on smoke stack industries to one based on high technology and service industries. The information systems and telecommunications technologies are the fundamental drivers of these changes. The transformation is remarkable, not only in its scope, but also in the pace of the change. In ten years, for example, almost all business offices and many industrial process systems have been radically changed by the introduction of information systems technology.

The character and pace of these changes suggest that the population base for the Army manpower of the Year 2000 will be different from today's population base in ways which are particularly important to the Army's future requirements. For example, the automotive mechanic of the Year 2000 is likely to be "culturally" different from the automotive mechanic of the 1970's. It can be anticipated that he will routinely work with both sophisticated built-in diagnostic and prognostic systems in vehicles, computer-aided instructional methods, and computer-based engine analysis.

The prospects are that the current measures of the manpower base will not be an adequate basis for manpower planning for the Year 2000. It may be anticipated for example that characteristics of the future manpower base which will be of significance are:

1. Computer literacy will be high. Continued exposure to computer-aided systems will provide all members of the population with familiarity and skill in computers which will be far greater than that of today.

2. Computer-based training will be a familiar experience. Personnel will be accustomed to job orientation and training systems which are computer-based and provide accelerated training programs. This will be particularly true of computer-based systems themselves. (The techniques for instruction used in the MacIntosh Personal Computer is a present day example.)

3. A larger percentage of personnel will have experience and training in activities related to logistics. More personnel will be trained in services which will be similar to logistics activities in the Army. There

will be fewer assembly-line workers and more clerical workers. Those who do work in production activities will be trained in sophisticated controls, diagnostics, and repair.

An aggressive program of R&D in demographic data methods and in economic trends is needed to update analytic and planning methods and to establish a set of fundamental assumptions which can provide the basis for Army planning.

APPENDIX C

Issue II: Army Training Requirements

The active Army end strength has been and is projected to be roughly constant at about 780,000 (780,400 in FY 82 to 780,900 in FY 88). From FY 82 projected through FY 88 the number of enlisted man-years of training for individuals on Permanent Change of Station (PCS) moves to TRADOC for the active force component increases by about 5,000 or about 10% (from about 47,600 man-years to about 52,500 man-years). If the man-years of TRADOC training for enlisted personnel on Temporary Duty (TDY) status were included, the increase would be about 3,000 man-years larger (enlisted man-years of training for TDY personnel is projected to increase from about 5,000 in FY 92 to about 8,300 in FY 88). Thus, considerably more TRADOC training is projected to be required for a constant active end strength. This increase in the training requirement also shows up in the approximate 4,000 increase in the individuals account (Trainees, Transients, Holdees, and Students (TTHS)) from FY 84 to FY 91 in the current POM (from about 100,900 in FY 84 to 104,500 in FY 91 with a low of 95,500 in FY 85). With a constant end strength, any increase in trainees and students results in a corresponding decrease in the force structure allowance.

In the ARNG there is a projected increase of about 33 percent in the TRADOC training of enlisted personnel from FY 82 through FY 88 (from about 15,500 man-years to about 20,200 in FY 88). During the same time the end strength is projected to increase about 15 percent from about 409,000 to 468,000. Thus, the training requirement is projected to increase more rapidly than the end strength in the ARNG.

In the USAR, the enlisted personnel training requirement in TRADOC is projected to increase by about 11 percent (about 1,300 from 11,500 to 12,800) from FY 82 through FY 88 during a period when the end strength is projected to increase by about 15 percent (from about 242,900 paid drill strength in FY 82 to 282,300 paid drill strength in FY 88).

Thus, Army training requirements are projected to increase significantly more than can be explained by changes in end strength (with the possible exception of the USAR).

Increased training is required in part because of the proliferation of the types of Army equipment in modernization processes. There has been a proliferation of MOS in the Army over the years. This proliferation of MOS is due both to the proliferation of types of equipment and to the specialization of individuals to specific jobs. In the electronics area, in many cases an individual must return to school between each change in assignments.

Other possible reasons for the projected increases in training are the complexity of new equipment and the shifts in the locations of responsibilities of selected maintenance functions within the Army. The impacts of these items are not clear.

It is quite evident that training requirements are increasing for the AC where there are not significant projected changes in end strength. At the same time numerous logistics functions with non-trivial training requirements (e.g., CMFs with average course lengths of 10 to 36 weeks in Mechanical Maintenance and Air Defense Systems Maintenance) are being shifted to the RC. With such changes the RC training problem is going to be more rather than less difficult to solve.

APPENDIX D

Issue III: Personnel Management to Meet Future Logistics Demands

A. THE NEED FOR HIGHLY SKILLED MAINTENANCE AND SUPPORT PERSONNEL

1. Introduction

Within recent years the Army has fielded a new generation of weapons systems and, by means of the Product Improvement Program (PIP), will keep them updated by inserting selected high technology as it becomes available. The process of planning for the next generation of weapons systems also has begun, serving to support and focus the technology base research and development programs. As the systems continue to improve and to evolve, the need for highly skilled maintenance and support personnel will continue to increase.

The application of technology to the Main Battle Tank has been examined and illustrates Army utilization of high technology.

2. Technological Advances and MOS Training Requirements

The major impact of advanced technology in the Main Battle Tank has been in the fire control system. The MOS designation for fire control specialists since 1960 has progressed from 41C to 34G to 45G with increased training requirements. Chart D-1 on page 37 illustrates:

- o Product improvements to the M60 tank from 1960 to 1978;
- o Introduction of the M1 tank in 1981;
- o Projected block improvements (e.g., PIP) to the M1 tank to the year 1991; and
- o Fire Control MOS training requirements -- past, present, and projected.

3. Technical Manuals

Another measure of technology utilization is the growth in technical manuals. Chart D-2 on page 38 illustrates a 33% growth in the page count for the M60 technical manuals, from the first M60 in 1960 to the M60A3 in 1978.

The format for the manuals was changed for the M1 to include more illustrations. This change accounts, in part, for the four-fold increase in the technical manual page count. However, the increase is attributable also to the design changes, for example, from mechanical systems to electrical/electronic systems.

4. Future Main Battle Team Systems, Technology and Transparency

The Army has begun its homework for the next generation of combat vehicles, including the Main Battle Tank. A series of contractor and in-house studies titled "Future Close Combat Vehicle Systems (FCCVS)" has been conducted by AMC's Tank-Automotive Command. TRADOC's Combined Arms Center (CAC) recently issued, for comment, the "Final Draft Umbrella O&O Plan for the Heavy Forces Family of Vehicles (HFFV)." The HFFV is envisioned as a follow-on/replacement vehicle to fifteen systems now managed or under conceptual evaluation. The significant feature of HFFV is a strong emphasis on modularity, commonality of components, maximum hull commonality, common vetronics (vehicle electronics) architecture, and multiple system capabilities. The Army recognizes, however, that even with the fielding of HFFV, there will continue to be a high/low mix of equipment and technology through the Year 2000. (This ASB SS supports the HFFV concept as being precisely the approach needed to reduce the number of MOS and the current high training requirements.)

This ASB SS also recognizes, and fully supports, the thrust to incorporate technology in a manner which simplifies the crew tasks and renders the complexity of the system transparent to the user. Helicopter systems (e.g., Light Helicopter Experimental (LHX)) are moving in that direction. For combat vehicles, the Surrogate Research Vehicle (SRV) and Tank Test Bed (TTB), soon to begin experimental testing, have the same objective. The sketches on a following page illustrate the movement from an analog/manual gunnery station (M60) to a digital/electro-optic/push-button crew station (TTB). The latter system contains the technology needed for diagnostics/prognostics, embedded training, map displays, and artificial intelligence -- attributes necessary for ALB.

B. THE POOL OF POTENTIAL ARMY RECRUITS: QUANTITY AND QUALITY

US Census Bureau figures for 1980 project that the total age group of 18-21 year olds will decline significantly through 1995 then turn upward. At the same time the 17-24 year old male population will decline. The 18 year old cohort, except for Blacks who register a slight increase, is decreasing at a rate of 3% per year. Competition will increase as employers dependent upon the under 24 year old group experience a declining pool of recruits.

"Quality" will decline among Army's accessions as a function of this documented decline in the quantity or pool of potential recruits. This contention is supported by the conclusions in the OSD document Profile of American Youth: 1980 Nationwide Administration of the Armed Services Vocational Aptitude Battery (dated March 1982). Based on these data, Army has substantially more mental Category III's than are in the general population but among the Armed Services it also has a larger proportion of Category IV's.

CHART D-1

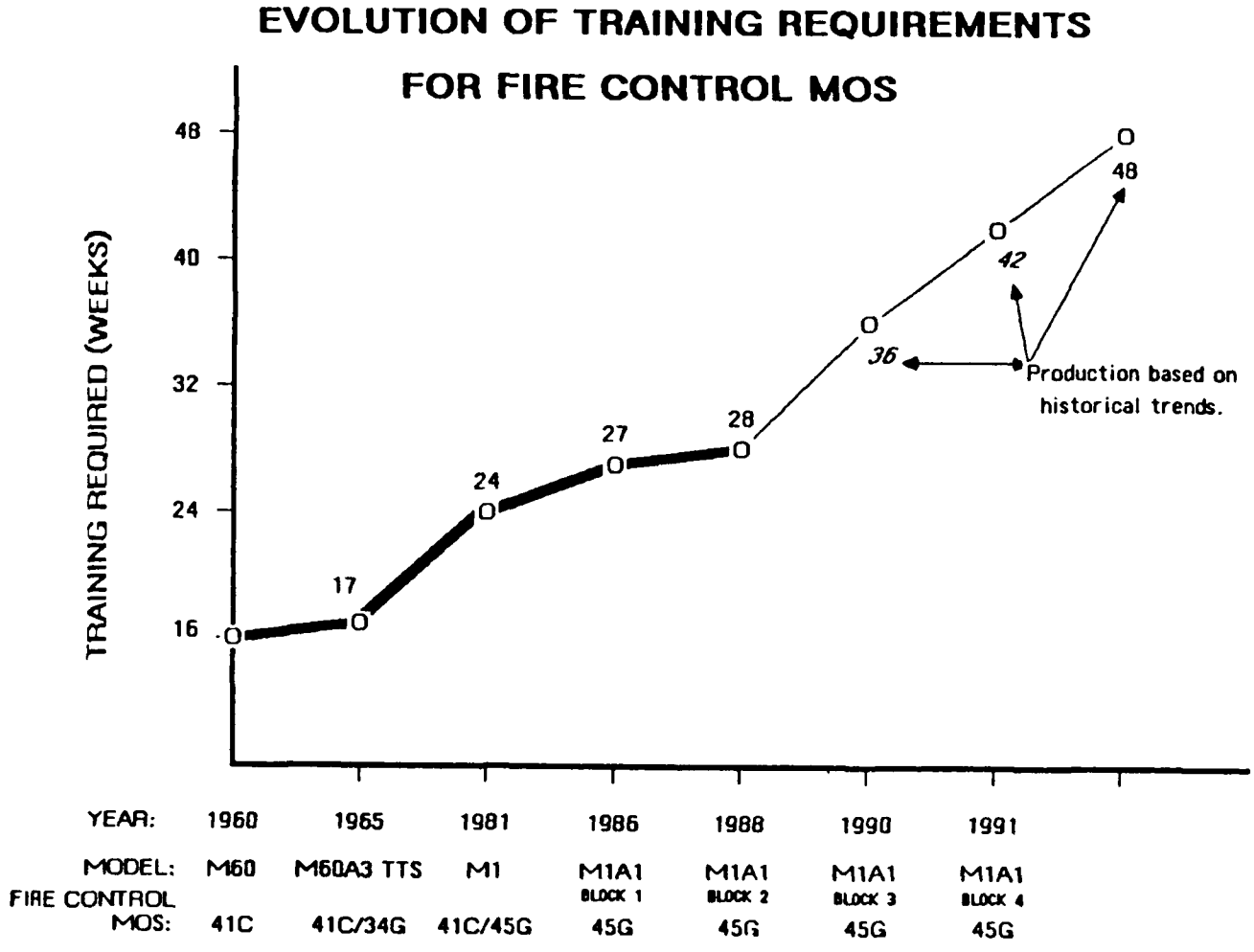
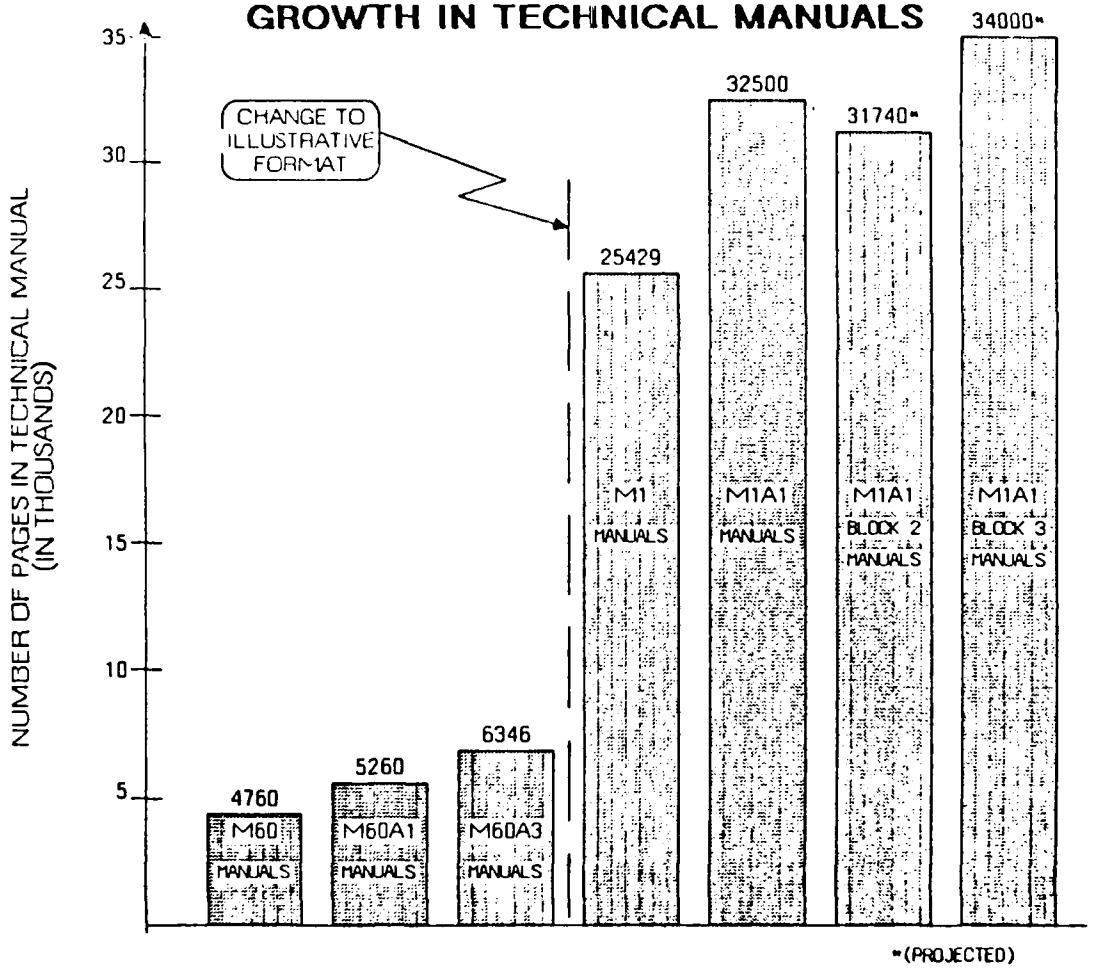

EVOLUTION OF TRAINING REQUIREMENTS
FOR FIRE CONTROL MOS
TRAINING REQUIRED (WEEKS)
48
40
32
24
16
17
24
27
28
36
42
48
Production based on historical trends.
YEAR: 1960 1965 1981 1986 1988 1990 1991
MODEL: M60 M60A3 TTS M1 M1A1 BLOCK 1 M1A1 BLOCK 2 M1A1 BLOCK 3 M1A1 BLOCK 4
FIRE CONTROL MOS: 41C 41C/34G 41C/45G 45G 45G 45G 45G

CHART D-2


GROWTH IN TECHNICAL MANUALS
NUMBER OF PAGES IN TECHNICAL MANUAL (IN THOUSANDS)
35
30
25
20
15
10
5
CHANGE TO ILLUSTRATIVE FORMAT
4760
M60 MANUALS
5260
M60A1 MANUALS
6346
M60A3 MANUALS
25429
M1 MANUALS
32500
M1A1 MANUALS
31740*
M1A1 BLOCK 2 MANUALS
34000*
M1A1 BLOCK 3 MANUALS
*(PROJECTED)

As technologic advances continue, driving the demand for the best and brightest youngsters both in industry and the other military services, the Army certainly will experience increased competition for accessions. To reach targets, the Army's current yield from the 17-19 year-old group is one in 12. As the youth population declines to the year 1995, the yield must increase to one in nine. These facts force the conclusion that, in competition with the other Armed Services and civilian employers, the Army must maintain and increase its current yield of the higher mental category (I-IIIa) accessions from this declining pool.

The projection further is that as the potential pool declines numerically, Hispanics will displace Blacks as the largest minority, reaching 24 - 30% of accessions in the Year 2020 (I Am The American Soldier, FC 21-451 dated March 1985). The Army currently has a higher proportion of higher mental category soldiers from these two minority groups than is these groups' representation in the general population.

Again, to forestall declines in "quality," Army will need to compete effectively to maintain its current percentage yield when these minority groups have increased representation in the US population.

C. ACCESSION, RETENTION, AND TRAINING

1. Introduction

MOS training is a substantial part of the cost of a soldier, and MOS training costs account for roughly 10% of the Army budget. While conventional cost analyses frequently describe the cost of a soldier in terms of pay, allowances, and benefits, the costs of recruiting, training, and replacing skilled personnel are an important component of the total costs to the Army and often are not adequately considered. In addition, the trainee-soldier, while included within the total end strength of the Army, is not yet fully productive.

Within the CMFs and MOSs comprising the logistics field, the investment in training time and costs often is especially critical. To acquire MOS qualifications, soldiers receive many weeks of training at a formal Army school or training center, supplemented by extensive on-the-job training. Since this investment by the Army produces benefits only in proportion to the eventual utilization of the skills learned by the soldier, the attrition rate of trained individuals has a direct bearing on the cost effectiveness to the Army.

During briefings to this ASB SS by the Maintenance Branch, Supply and Maintenance Division, DCSLOG, several major areas of concern regarding maintenance personnel were expressed. These included:

- o High turnover rates;
- o Shortages of critical maintenance personnel;
- o "Up or out" programs forcing the technically qualified E4/E5s out of the Army; and
- o Malassignment of trained personnel.

Concentrating on the first three of the four above points, the following discussion reviews current recruiting and retention problems, along with investment costs associated with three logistics MOSs. These MOSs (31E, 45N, and 94B) are representative of high-medium-low skill requirements, technology applications, and training investments. Further, they offer a representative picture of the personnel problems within logistics.

2. Retention Problem: Quantity and Quality

For gauging retention rates, the Army currently utilizes three categories: initial term (usually one to six years); midterm (second or subsequent reenlistment with less than ten years of service); and careerists (more than ten years of service). Traditionally, the reenlistment rate has been expressed as a percentage of those eligible at Expiration of Term of Service (ETS). From FY 83, rates also have been calculated as a percentage of the total number at ETS, regardless of eligibility, to reflect the fact that all existing soldiers must be replaced to meet manpower requirements. Table 1 below presents both rates for each personnel category.

TABLE 1

INITIAL	MIDTERM CAREERISTS (One to Six Years)		(Up to Ten Years)		(Greater than Ten Years)	
	% Eligible	% at ETS	% Eligible	% at ETS	% Eligible	% at ETS
FY 83	45.9	34.8	76.7	65.7	95.1	69.9
FY 84	43.7	34.8	78.1	65.8	95.4	71.0
FY 85(MAY)	45.7	38.7	75.9	63.9	95.4	72.2

For many logistics MOSs, much of the training investment occurs during the initial term. The rates of reenlistment at this first "decision point" have been analyzed in detail for the three selected MOSs. Table II represents a compilation of data for the Active Army in FY 83, FY 84, and the first six months of FY 85. The total number of personnel is 7,049 (of a total FY 85 authorization for three MOSs of approximately 20,000).

TABLE II

MOS	Initial Term Reenlistment Rates % of Eligible	% at ETS (N=7059)
31E (Field Radio Repairer)	58.6	50.1
45N (M60 Tank Turret Mechanic)	41.6	30.8
94B (Food Service Specialist)	46.1	33.5

While these rates do not differ significantly from the overall Army rates, they must be examined further in terms of the quality of personnel electing to reenlist, compared with the Army's targets for quality. Recruiting targets by mental category for the three CMFs represented by these MOSs are provided in Table III (FY 84 data):

TABLE III

MOS	CMF	Recruiting Target (%) I-IIIA	IIIB	IV	Actual (%) I-IIIA	IIIB	IV
31E	29	89	10	1	75	14	9
45N	63	60	27	12	40	30	28
94B	94	50	30	20	33	32	34
All Logistics CMFs		66	23	10	44	29	26

Within the three example MOSs, the percentages by mental category of those electing to reenlist are as follows:

TABLE IV

PERCENTAGES OF REENLISTEES

MOS	I-IIIA	IIIB	IV
31E	43	24	33
45N	23	28	49
94B	23	27	50

Although a small sample of the total logistics force, the preceding statistics would support the following conclusions about these MOSs:

1. Retention, when expressed as a percentage of the total number at ETS does not exceed 50.1% for the initial term.

2. Of those electing to reenlist, the lower mental categories greatly predominate. This experience is completely at variance with the initial recruiting targets.

3. Training Investment

A compilation of training costs (based on FY 83 data) has been performed for all MOSs within the Army. This compilation breaks down the total costs into fixed and variable components, with the variable component providing an indication of the marginal cost of each trainee. A summary of the training time and variable costs for the three selected MOS's through Primary Leadership Training (roughly equivalent to a first- term enlistee) is provided in Table V.

TABLE V

MOS	Army Training Center (wks)	Army School (wks)	Cumulative Variable Costs	Cumulative Total Costs
31E	11.3	25	$22,821	$40,387
45N	11.3	8.5	$16,253	$27,453
94B	18.9	0	$ 9,185	$13,202

As an additional component of first-term investment, enlistment bonus figures were obtained for each MOS (as of May 1985), and these range from $4000 for 94B, $3500 for 45N, and $0 for 31E.

Neglecting all other recruitment costs, which should be spread evenly over all new recruits, it can be seen that the total Army investment, both in time and dollars, is considerable. Using only the variable costs plus enlistment bonus, those personnel leaving the Army from these MOSs in FY 83 through FY 85 (6 months) represent a total "lost" investment of nearly $64M. When fixed costs are included, the total jumps to nearly $90M.

4. Impacts on Operating Strength

Within a fixed end strength for the active Army of approximately 780,000, a significant portion of the total force is classified as TTHS. In FY 84, this component represented nearly 101,000 personnel, reflecting, in part, TRADOC training commitments of roughly 50,000 man-years. When the ARNG and USAR are also considered, TRADOC projects a total training requirement for FY 88 of nearly 94,000 man-years, which is a significant investment of Army resources.

If retention rates were to be improved, or other options implemented to reduce the training requirements for logistics CMFs, the impacts would be two-fold: the TTHS account would be reduced, with a corresponding increase in operating strength and unit readiness; and the reduced TRADOC requirement would free both training budget and personnel resources for other applications.

D. OPTIONS TO IMPROVE LOGISTICS PERFORMANCE

1. Improved Retention Rates

While a highly visible Army recruiting slogan states, "It's a great place to start," the Army should enjoy substantial benefits by emphasizing the notion that "It's a great place to finish also." Obviously, it is neither desirable nor possible to retain all first-term and subsequent term personnel, but an improvement in the retention rates is certainly possible.

All goals for retention should recognize the desired quality mix within each MOS as well as the cost of replacement as compared to the costs associated with long-term retention. No evidence has been seen that a true economic analysis has been performed in establishing retention targets, enlistment or reenlistment bonuses, and the long-term effects of those on the total Army budget. Given the significant cost of training, especially in high skill, high technology logistics MOSs, it would be reasonable to assume that an improvement in retention will be cost- and mission-effective, yielding improved rates of MOS-qualified personnel and consequent improvements in unit readiness. However a detailed study is required to estimate the trade-offs involved and the total budget impacts.

2. Better Utilization of Trained Personnel

Malassignment of trained personnel continues to be a problem and one which is difficult to solve considering the many factors that cause it. A potential solution to one aspect of the related problem of personnel utilization is modification of the "up or out" requirement that exists in many MOSs. Technically trained personnel are faced with the decision to either leave the Army or progress within the Non-Commissioned Officer ranks not in their area of technical specialty. As also noted in the ASB 1982 SS (page 36), promotion policy for enlisted personnel exacerbates the problem of personnel mismatches.

Although the Army has reviewed this issue in the past, again this this ASB SS Group suggests strongly that the EPMS be reevaluated to define options to this policy. By establishing a career skill track, independent of traditional leadership progression for selected MOSs, the Army likely would achieve both a higher retention rate and the continued benefit of the skills already learned by the trained, experienced

E4/E5. The Army needs these individuals, needs their skills and experience, and should make every effort to retain them.

3. Resolve Obligations of Private Contractors

The Army is continuing to increase its use of private contractors to fill key maintenance and other support roles during peacetime. The ASB SS Group agrees that this use provides substantial benefits, but it also recognizes the concerns expressed within the Army about the availability of these personnel during wartime.

Although these concerns may be overstated, they nevertheless represent a problem that requires resolution now. The obligations and functions of these civilians and their legitimate combatant status in a wartime situation, must be clearly defined, and steps taken at the appropriate levels to translate this definition into any necessary legislative or administrative action.

References:

1. "Military Occupational Specialty Training Cost Handbook," Cost Analysis Division, US Army Finance and Accounting Center, Oct. 1983

2. Briefing paper, Mr. Jeff Wetjen

3. Information paper, "Reenlistment and Retention Rates," Office of DAPE-MPD-EP, 12 June 1985

4. DAPE-MPD-EP, July, 1985

5. Non-Prior Service MOS Management Matrix, FY 84

APPENDIX E

Issue IV: Logistics Models and Data Bases

The Army uses available logistics models and data bases as tools in CSS force structure planning. The models are based on linear assumptions and do not appear to include the gains in efficiency that are available through aggregation. The models, as currently formulated, do not use real life constraints. They are open ended, using the inputs supplied by field commanders as requirements, rather than the limits which are imposed by limitations of supplies, time, transport, etc. Simulations should be conducted for the CSS based on constraints as listed above. Consequently, modelling results usually are adjusted by analysts' judgments not based on quantitative factors.

The Army requires accurate, valid data for every system in the force structure for system support and force structure planning (TMDE, spare parts, provisioning, tools and equipment, maintenance performance, training, diagnostic and repair, and workload factors). The ultimate utility of the logistics data depends upon:

- The quality and accuracy of data delivered with initial fielding of the system;
- The quality and accuracy of data collected from actual usage of the systems during its life cycle.

The data base must be updated and maintained to reflect the configuration of the system as it undergoes changes.

The present process which generates the required data begins during full scale development, PIP, or acquisition planning for NDI. An ILS program is performed during this development phase. A key element of the ILS program is LSA, which is the process by which the initial logistics source data base is produced. The trend toward increasing complexity of systems generates more source documents, more data, and more complex verification requirements. Complexity and quantity of data requires increased reliance on automation. If the data are substantially in error or become outdated, the logistics mission is impaired, particularly in support and maintenance functions and in logistics support force structure planning.

Force structure planning for the CSS structure of the Army relies heavily on systems documentation and the LSA data base. Assessment of the quantities and type of MOS skills is heavily dependent on work load factors derived from these data bases. These assessments, in turn, are used to decide the quantities and types of TOE units needed in the CSS force structure. Significant errors in the personnel skill assessments and workload factors contained in the LSA data base will propagate throughout subsequent manpower and MOS planning activities. When the planning for support for all systems in the Army is aggregated, requirements for the overall force structure could be seriously misstated. Programs to collect logistics workload data on

systems after they are fielded through their life cycle are accomplished only on a sampled basis; i.e., only a limited number of "high visibility" systems are subjected to SDC. Only those systems in the SDC program stand a chance of having initial workload estimation errors corrected later in their life cycle.

The LSA data format that is used during systems development to create the initial data bases is reasonably well prescribed by Department of Defense (DOD) Directives, AR's, and Military Standards (MILSTDS). The LSA program is a system of analysis worksheets, computer programs, and output reports. These records provide a single logistical data base for input, storage, and retrieval of LSA data. The effectiveness of the LSA program was not examined in detail. The briefings and subsequent discussions with logistics force structure planners suggest that the LSAs, while standardized, were somewhat cumbersome and complex and should be simplified in format and structure. There were also perceptions that the overall resources (personnel and dollars) applied to the LSA aspect of ILS of NDI was sometimes less than needed when compared to other program elements. If this is, indeed, the situation, it should be corrected so that ILS, in general, and LSAs in particular, are treated as an essential development activity with equal priority to other program elements.

The formats and procedures used to collect data for the SDC program for systems after fielding are not standard. The following variations exist:

- The specific data points collected vary across commodity commands and from one subordinate command to another.
- Sample data collection is conducted at organizational maintenance level, for the most part, not at higher echelons of maintenance (DS, GS, Depot).
- SDC items are prepared and implemented individually for each system selected, on a case-by-case basis.

In essence, sample data seem to be collected to support the commodity commands for their specific logistics functions at the wholesale level. The data are neither complete nor easily used to support logistics planners, particularly in force structure planning at the "macro" level (types, quantities of support units needed) nor at the "micro" level (skill mix and quantities of personnel needed within the TOE structure of units).

According to information presented during Logistics Center (LOGCEN) briefings and subsequent discussions with LOGCEN personnel, there are presently 41 systems subjected to SDC. These systems are purported to represent only about one-half the required CSS force structure base.

When LSA data and SDC data are used as key inputs to force structure planning models, significant potential sources of error exist. First, for systems where no SDC data is collected, LSA data is used which is generated

by analysis, not actual experience. It is believed that the LSA estimates are "good," but no real validations exist. Second, the SDC data is inconsistent across the various systems for which it is used and probably represents significant errors in statistical workload estimates. Logistics manpower and force planning personnel are aware of these limitations and informed this ASB SS Group that they use subjective judgments when using the data; i.e., CSS force structure planning is essentially an estimation process.

It appears that in the face of budget and resource constraints, the Army needs "precision" decisions in its logistics support manpower and unit force structure for Army 2000. To achieve precision, significant enhancements are needed in the CSS force structure planning models, in the LSA data bases, and in the collection of data after fielding. Above all, these efforts should be integrated and fully compatible with each other. LSA formats and processes should be reviewed with a view toward simplification. Logistics-knowledgeable Program Management teams and sufficient funding, not subject to diversion, must be applied to the ILS and LSA elements of programs during early development and acquisition.

AMC, in collaboration with TRADOC, should re-define and restructure its data collection program for systems after fielding to incorporate the data needs of CSS force structure planners. The objectives of this effort should be:

- Rigorous standardization throughout the Army in the definition and formats of data to be collected;
- Simplicity;
- Productivity in collection, data storage, and retrieval through use of modern information system technologies;
- Rigorous discipline in the data collection effort; and
- Inclusion of all Army systems.

TRADOC, in turn, should develop a CSS force structure planning data base, compatible with the new AMC data collection program.

There are, indeed, some problems in implementing such an integrated information system program. However. information systems technology is clearly available to support the effort. Substantial increases in the quality and quantity of skilled personnel assigned to these programs is required, as well as substantial investment in data processing technologies and systems. As the Army's systems become more complex, the qualitative aspects of the data base become more important and more complex. For example, analysis of skill level required for "high tech" supply and maintenance personnel is substantially an "expert opinion" process. Because it appears that not enough experts will be available to conduct these analyses, substantial investments in artificial intelligence, specifically expert systems technology, will be required. Indeed, the areas of LSA and SDC after fielding is an area where expert systems technology can yield significant payoffs.

APPENDIX F

GLOSSARY OF TERMS AND ABBREVEATIONS

AC	Active Component
AI	Artificial Intelligence
ALB	Airland Battle
AMC	Army Materiel Command
AOE	Army of Excellence
AR	Army Regulation
ARI	Army Research Institute
ARMY 21	Army of the 21st Century
ARNG	Army National Guard
ASB	Army Science Board
CAC	Combined Arms Center
CACDA	Combined Arms Center Development Activity
CMF	Career Management Field
CONUS	Continental United States
CSS	Combat Service Support

DCSLOG	Deputy Chief of Staff for Logistics
DCSOPS	Deputy Chief of Staff for Operations
DCSPER	Deputy Chief of Staff for Personnel
DS	Direct Support
EPMS	Enlisted Personnel Management System
ETS	Expiration of Term of Service
FCCVS	Future Close Combat Vehicle Systems
FY	Fiscal Year
GS	General Support
HFFVS	Heavy Forces Family of Vehicles
HQDA	Headquarters, Department of the Army
ILS	Integrated Logistics Support
IRR	Individual Ready Reserve
LHX	Light Helicopter Experimental
LOGCEN	Logistics Center
LSA	Logistics Support Analysis
MANPRINT	Manpower and Personnel Integration

MOS	Military Occupational Specialty
MTTT (MT^3)	Maximum Time to Train
NDI	Non-Developmental Items
NCO	Non-Commissioned Officer
O&O	Organizational and Operational
PCS	Permanent Change of Station
POL	Petroleum Oils & Lubricants
POM	Program Objective Memorandum
PIP	Product Improvement Program
RAM	Reliability, Availability and Maintainability
RC	Reserve Component
R&D	Research and Development
RMTS	Regional Maintenance Training Sites
SDC	Sample Data Collection
SRV	Surrogate Research Vehicle

SS	Summer Study
SSC	Soldier Support Center
TDA	Table of Distribution and Allowance
TDY	Temporary Duty
TMDE	Test Measurement and Diagnostic Equipment
TOE	Table of Organization and Equipment
TRADOC	(United States Army) Training and Doctrine Command
TTB	Tank Test Bed
TTHS	Trainers, Transients, Holdees, and Students
USAR	United States Army Reserve
USAREUR	United States Army Europe

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